ENA Electricity Networks and Futures Group

DER TECHNICAL FORUM

MINUTES

Tuesday 6 May 2025

MS Teams Meeting

ATTENDEES

Name	Initials	Company
Andrew Hood	AH	NGED
Chris Marsland	CM	Clarke Energy and AMPS
Darren Farr	DF	INFINIS
Dick Allen	DA	Green Highlands, Connections consultants
Ian Wassman	IW	IntPRO
Jason Kirrage	JK	Solar Edge Technologies
Jeevan Dhaliwal	JD	ENA
Jyh Yeong Chu	JYC	GTC
Lukasz Bochinski	LB	UKPN
Matthew Porter	MP	PS2 Consulting
Mike Kay	MK	ENA
Milana Plecas	MPL	SPEN
Nataliia Myrhorodska	NM	ENA
Paul Carpenter	PC	Solis Inverters UK
Philip Bale	PB	Roadnight Taylor
Richard Harrison	RH	Clarke Energy
Rose Wabuti	RW	NPg

Samuel Adekanle	**SA**	**Renewable Energy Association**
Stephen Sommerville	**SS**	**Aurora Power Consulting**
Tim Ellingham	**TE**	**RWE**
Tom Woods	**TW**	**Viridor**
Tony Robinson	**TR**	**TVRI**

APOLOGIES

Name	Initials	Company
Aaron Thompson	**AT**	**Lightsource BP**

MEETING NOTES AND ACTIONS

1. Welcome, Introductions and Acceptance of Agenda		MK
Accompanying meeting slides should be referred to for detail.		
Actions	None	

2. Actions from previous meeting	MK
Most actions from the previous meeting were covered by the agenda apart from one, which was previously discussed quite briefly. Issue 133 Raised by SS, which is the timeframe with which licensees take to review submitted information, particularly studies. This has been raised to DNOs who are currently considering this and will report back in due course. SS highlighted that NESO have a SLA of timeframes they declare in order to provide comments back, which is currently 15 business days and moving up to 20 business days. He appreciated the difference between DNOs and NESO but perhaps a high level commitment to that sort of timeframe for example 30 business days would be reasonable. SS also clarified that NESOs timeframes are definitely formalised and are for customers' benefit in streamlining the interaction with NESO. MK explained that DNOs are considering the issue but have not yet come to a common view.	

Actions	Ongoing discussions with DNOs. **Ongoing**	MK

3. G99 Issue 2 published.	**MK**
EREC G98 and G99 Issue 2 has been approved by Ofgem on 10 March 2025. They are both published on both the ENA Document Catalogue and DCode website free of charge. Alongside the published versions the tracked change versions are also available on the DCode website, so you are able to see exactly what has been changed.	
Actions	None.

4. Short time paralleling 5 minute limit	**MK/TW**

OM3 – 5 minute per month limit

This issue was raised by TW to the ENA. MK provided the group with a high-level overview of the challenge, and invited TW to fill in any gaps in his description.

5 minutes is insufficient to properly test an emergency diesel generator under load. Additionally, there are concerns that moving away from short-term paralleling could, in the case of larger units, lead to the generator being classified as a Type C or D unit. This would trigger compliance requirements under the RfG, which is not the intended outcome. Furthermore, using a load bank to avoid extended paralleling is not an ideal solution, as it fails to replicate real-world operating conditions for the generator.

For background, this has been a long-standing requirement, originating 20–25 years ago. The original rationale was to minimise the need for extensive protection, as the likelihood of an island forming within that 5 minutes was considered negligibly small. Additionally, the time limit serves as a safeguard to prevent generators from operating beyond the intended scope and potentially gaining a commercial advantage.

In 2016, the RfG introduced similar requirements but added a clause stating that maintenance activities do not count toward the 5 minute limit. This specific wording could be interpreted as permitting the type of testing referenced in the original challenge.

While G99 arguably already provides for such scenarios, the interpretation may need to be clarified. Section 9.6.3.3 attempts to address this issue, but its wording still leaves room for differing interpretations.

In summary it seems disproportionate to force the regular use of load banks and cause OM3 PGM to meet Type D requirements Feedback from DNOs suggests that a practical compromise might be to formally extend the 5 minute threshold. This could avoid the need for full interface protection, which while not negligible, represents a relatively minor cost when compared to other associated implications.

However, one important consideration is that running for periods longer than five minutes would necessitate a review of the earthing arrangements to ensure harmonic impacts remain acceptable.

MK then presented proposed revisions to the G99 text, which would formalise the extension of the 5 minute limit, subject to agreement, on the condition that full G99 interface protection is commissioned, and attention is given to the earthing requirements. The proposal also includes a formal exemption from the requirements in chapters 11, 12, and 13, which align with the RfG requirements.

One item that requires wider consideration and potentially being raised with NESO, concerns the operational implications of running power generating modules (PGM) of 10MW or greater as these would be classified as Type C or D. Specifically, such a PGM would not deliver the expected system response expected from Type C and D PGMs.

If this practice became more common across the network, the cumulative impact of multiple units operating in this way could be a cause for concern. A solution might be to limit such operations during periods of high national generation.

TW stated the voltage connected level is starting to drive these Type D machines. This issue primarily involves smaller machines, typically up to 5MW, but if connected at 132kV automatically become Type D.

TW has approached the DNOs to request longer running time without being classed as parallel operation. However, these have been rejected and some DNOs are insisting on the 5 minutes, which is leading to the use of load banks. This situation compromises the accuracy of the power generated and creates an unsafe system, as the synchronising breaker is not properly checked to confirm whether it's picking up load.

PB agreed with TW, noting that this issue will impact Data Centre applications. For instance, a recent case involved 21 reciprocating engines. Given that these are separate modules, as defined in G99, the 5 minute limit is too short. Extending the duration to 1 hour per unit could potentially result in up to a day's worth of generation that is on the system. While long-term parallel operation appears to be a viable option, there is concern about unintended consequences, such as having to go down project progression or the challenge of running units for testing purposes without inadvertently contributing to an SGT reinforcement, especially when there is no intention to export.

There is a middle ground to be found, one that ensures appropriate protection is in place while balancing the associated risks and costs in a sensible way.

MK noted that, in essence, we are reverting to G59, as we are applying all aspects of G99, except for the new sections in chapters 11–13. It was agreed all Forum members can provide feedback on the proposed draft text. This issue will remain open until the next DER TF meeting. MK suggested that we aim to gather comments on the proposed G99 text by mid June

Actions	Respond to proposed G99 text (on slide 12) **13/06/25**	Forum members

5. IDNO/DNO responsibilities for generation connexions	**MK**

Issue 134

Where a connexion is made to an IDNO network, what is the division of responsibility between the DNO and IDNO for G5 and P28 compliance issues?

MP provided background on the topic, outlining key points related to the connection between IDNOs and customers, as well as interaction with the upstream DNO. The interaction between DNO and IDNO is not handled consistently by the DNOs. MP noted that these inconsistencies can also cause conflicts with the requirements of competition in connexions..

SS agreed with MP's observations, noting that this is likely to become a more pressing issue in the near future. A particular concern is the application of G5/5, when multiple customers are connected to a DNO network via an IDNO, how is compliance managed? It's assumed that the IDNO must demonstrate conformity with the DNO's requirements. While P28 may not apply directly in IDNO-to-DNO connections, G5/5 appears to do so, making the situation more complex. SS also noted that G5-5 is adopted by NESO for managing harmonics, whereas P28 is only partially referenced in the Grid Code.

MK noted that the interface between a DNO and the transmission system differs from the interface between a DNO and an IDNO. It will probably be helpful to compare the relevant scope of P28 and G5 in this regard. Additionally, using the terms "upstream" and "downstream" in reference to the DNO provides greater clarity, as the roles of the DNO and IDNO can sometimes appear reversed depending on the context.

It was agreed that this topic will be revisited at the next meeting to allow time for any new information to emerge that could support resolving the issue.

Actions	Review the points discussed and see if more clarity can be provided on responsibilities and process. **Next Meeting**	MK/DNOs

6. P28 and transformer energisation	**SS**

SS delivered a concise presentation on transformer energisation, focusing on a growing issue as generation sites become larger and incorporate more transformers. He outlined the increasing confusion and conflict regarding how to handle the energisation of multiple similar transformers. Energising a single large grid transformer is straightforward and well-defined in P28.

However, when multiple transformers are involved, such as on a BESS or solar site, issues can arise, especially on larger sites. This is because P28 is based on conservative assumptions and doesn't fully account for the probabilistic nature of transformer energisation. It primarily considers the closing angle, remnant flux, and assumes a minimum fault level.

On a typical BESS or solar site, with category 2 transformer energisations it is technically allowed for there to be up to 4 events per month, each consisting of 4 rapid voltage changes (RVC) spaced 10 minutes apart. If a site has 16 transformers, each classified as a category 2 RVC, the energisation would have to occur over 4 days, which is impractical for the operator.

If P28 is taken at face value the only options are to follow its requirements strictly or invest in controllers or pre-insertion resistors. However, these solutions are high costs and probably over-specified because transformer energisation is inherently probabilistic; ie significant resources are being spent on mitigating a scenario that is unlikely to occur.

SS suggested revising the sections related to large generation sites to prevent developers from incurring unnecessary costs on mitigation measures that may not be required. He also recommended exploring the

inclusion of maximum fault levels or a probabilistic analysis approach for transformer energisation across multiple units and encouraged feedback on these proposals.

MP agreed and mentioned that he had raised this issue during the P28 guidance document consultation in February. He noted that, in practice, operators often don't energise transformers in the optimal way but instead follow a process to ensure compliance with P28. This issue typically arises during a total loss of supply, when all transformers need to be re-energised. A complete re-energisation of the entire site following such an event is rare and could require up to 7 RVC events..

PB noted that we're seeing more connections using intertrips which suggests that these events may not be as rare as previously assumed. He thought it might be worth examining how often these sites are de-energised for short periods.

SS pointed out that the primary scenario where this occurs would be during a LoM. Most sites would prefer an automatic reclose system, eliminating the need for appropriate staff physically on-site. However, this requires further clarification, as it falls outside the intended scope of the main transformer energisation

The issue arises when a disturbance on the network trips all the G99 relays, and these transformers need to be brought back into service. For example, on a 50MW site with 16 transformers to re-energise, waiting several days to stay within the P28 limits is not feasible. On the other hand, the DNO doesn't want these energisations happening without control, as it could cause network issues. There needs to be a middle ground, as transformer energisation is probabilistic, and the current P28 approach is based on worst-case scenarios intended for a single transformer. . MK acknowledged this but pointed out that valid LoM trips should be very rare now, and also that what actually tripped was the Generator's choice.

MP raised the question that, given the difficulty of making fundamental changes to P28, is there a way to make a judgment that doesn't require amending the standard but still allows for a more practical approach to managing the issue?

MK, noting that the P28 guidance is still in progress, suggested that SS send his slides to those working on the guidance to have his points considered. SS explained that he had already sent his presentation to Gary Eastwood from Threepwood and had suggested adding a brief section to EREC P28 to help clarify this issue.

NM acknowledged MP's comments, agreeing that this issue is outside the scope of the current guidance but could potentially be addressed in a future review of the Engineering Recommendation.

MK proposed pausing the discussion for now, as the next topic to be covered would be the updates to the EREP P28.

Actions	NM to share SS slides colleagues working on the P28 guidance. **16/05/25** Update subsequent DER TF with DNOs consideration of the points. **Next DER TF Meeting**	NM NM/JD/MK

7. EREP 28 update		MK
MK explained that the consultation process has been completed, with a significant number of responses received from the DER TF and DCRP members. Currently, the comments are still under review, and ENA aims to publish the final version by Q4 2025. NM acknowledged the need for a discussion but suggested finishing the guidance document first, after which the stance on EREC P28 could be revisited. MK noted that NESO does not directly use P28, but incorporates many of its elements into the Grid Code. He asked whether NESO addresses these issues differently under similar circumstances. SS confirmed this, highlighting that the main issues tend to arise with the Scottish networks, particularly when connecting to 33kV, which is the common practice of SPT. The challenge stems from low fault levels in these areas, affecting many projects. In these cases, SPT applies P28 as well as relevant Grid Code requirements, making the situation complex. MP explained that, in the case of tertiary connections, higher fault levels are typically encountered, reducing the power quality challenges. He also stated that the problem isn't necessarily with the content of P28, but rather with its interpretation.. MK suggested that this topic would be revisited in upcoming meetings, and invited anyone with suggestions on how to move forward to share their thoughts. For now, he recommended allowing the existing processes to continue.		
Actions	Ongoing discussions **Ongoing**	ALL

8. Updated SAF		MK
PB identified several issues, which have since been addressed. A note has also been added to clarify the terminology between firm and non-firm capacities. Additionally, a note has been included to ensure that registered capacity is clearly defined. The document was officially published on April 24th.		
Actions	None	

9. Minor discrepancies between G99 and Grid Code		MK
There are 2 minor discrepancies that have been added to a future non-urgent amendments list to G99.		
Actions	None	

10. Outstanding Forum issues		MK
Issue 112 – Registered Capacity, both the DG Guide and SAF have been updated. MK will send the revised documents to SS for review in order to close out the issue. BESS Connections – Issues 113, 114, 127. EREP P28 will address these concerns. <u>G100 issues from 07/10 DER TF</u> Ongoing DNO discussions covering: • Minor terminology related to HV connected sites • Mandatory requirement for back-up protection at HV • Use of protection in lieu of a full Customer Export or Import Limitation Scheme <u>Issue 132 – Fault Current Interrupters</u> CM mentioned that this issue was raised to the forum for a company he worked for. He understands that allowing their use could compromise fault ride through and fast fault current injection requirements within G99. He thought that this should have been a quick and straightforward solution, but progress has been slow. He pointed out that all he's hearing is that it's still on the agenda and under discussion, but there's no clear indication of whether it's feasible, a definite no, or somewhere in between. MK explained that his information was that on the specific project the company was working on, they encountered significant challenges with NESO and NGET regarding fault level management. This seemed to be a sticking point, although other issues have been resolved. Additionally, he suggested that when the statement of works threshold for is raised from 1MW to 5MW many such projects would not be bound by NESO's fault level concerns. AH explained that from NGED's perspective, their main concerns revolved around the fault ride-through capability, particularly given the interrupter-type device and the other concern was the fast fault current injection. He believed that if it can be demonstrated that the most onerous transmission fault does not trigger the operation of the fault current interrupter, the system should be able to ride through the fault. CM asked as NGED is making progress on this issue, and whether other DNOs are seeing similar advancements. RW responded that NPg had attempted to review this with their FCLI, specifically exploring its applicability within the DNO network rather than at the transformer connection end. However, they encountered other issues, and as a result, progress has stalled. MK suggested leaving the discussion open for now and gathering more material to bring to the next meeting, taking it as an action point. CM requested that each DNO provide a paragraph on their approach, noting that NGED and NPg's responses were particularly insightful. MK confirmed that this would be added to the agenda.		
Actions	Add Fault current interrupters to agenda for next meeting **Next Meeting**	MK

11. GC0117		MK
Submitted to Ofgem on 14 May 2024. Ofgem will publish their answer on 30 May.		
Actions	None	

12. EU Update		MK
MK explained that one of the new and significant requirements proposed for the RfG is all PPMs (at least Type Cs and Ds) will have to be grid-forming. The large scale blackouts in Spain and Portugal may strengthen the perceived need for these requirements. The Commission appears to have agreed to introduce new LFSM-U requirements for heat pumps and EVs, and making compliance verification by independent third parties mandatory. NESO is currently assessing the potential implications for Great Britain.		
Actions	None	

13. AOB	MK
<u>Grid Forming Inverters</u> SS expressed concern about the increasing adoption of grid-forming inverters. He noted that NESO has acknowledged the situation. He emphasised the need for a clear and coordinated position on their use within distribution networks. Some vendors are already beginning to incorporate grid-forming inverters into their projects, making it a pressing issue. MK suggested that the technology could present an opportunity and asked whether there would be any issues applying G99 standards to a grid-forming PPM, noting that similar concerns could arise with SPGMs. MP added that, unlike grid-forming inverters, synchronous machines are capable of producing significant fault current, whereas inverters are typically limited to 1.0 to 1.5 pu fault current. It was agreed that more thought would be given to this and discussed at future meetings. <u>Definition query</u> MP raised an ongoing frustration: why can't we standardise the definition of negative power as import and positive power as export? He noted previous issues with NESO, where some individuals were unclear on the distinctions between positive and negative power flow, as well as between leading and lagging power factors. He referenced a straightforward example from Germany as it's laid out very clearly in the BDE document. It's such a simple approach, and it makes complete sense. It's surprising that something so fundamental hasn't been standardised here. MK agreed that it was a valid and important question. He acknowledged the issue and explained that he had resisted NESO's push to amend G99 to reflect battery import requirements, as the Grid Code does not	

clearly define what that actually entails. Also mentioned that this could be raised as grid code mod, but would require someone with the right expertise to drive it forward. But for now, this shall be captured in these notes for further thought.		
Actions	Discussion regarding use of grid forming inverters in GB. **Next Meeting**	MK/ALL

14. Next Meeting		**MK**
Early September 2025		
Actions	JD to schedule next meeting **20/05/25**	JD